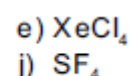
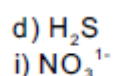
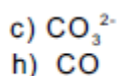
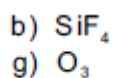
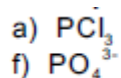


UNITS 1 and 2 REVIEW for FINAL EXAM:

STRUCTURE and PROPERTIES

1. Be familiar with the contributions of the following scientists to the atomic theory and be able to describe with the evidence each atomic model:
Dalton, Thomson, Bohr, Rutherford, Quantum Mechanics
2. Recognize the four quantum numbers and what they mean.
3. Write the electron configuration for the following elements in their ground state.
a) cobalt b) Molybdenum c) Iodine d) Europium e) Gold
4. Use Lewis diagrams to draw the following molecules or ions. Once completed, use the VSEPR Theory to predict the shape of each. For each molecule, decide whether it is polar or non-polar.



5. Methane and fluoromethane are two very similar molecules, despite their similarities, there is an 86 °C difference between their boiling points. Which of these two substances would have the higher boiling point, explain your answer.
6. The element iodine exists as solid crystals composed of I_2 molecules. A chemist wishing to dissolve iodine has a choice of two solvents; water and tetrachloromethane. Which of these two solvents would be the best choice? Explain your answer.

7. Consider the data in the following table for substances labelled "A" to "G".

Substance	Melting point (°C)	Boiling point (°C)	Solubility in H_2O	Electrical conductivity as: solid/liquid/aq. sol.
A	-94	65	SOLUBLE	NO/NO/NO
B	1610	2230	INSOLUBLE	NO/NO/NA
C	119	445	INSOLUBLE	NO/NO/NA
D	660	2467	INSOLUBLE	YES/YES/NA
E	770	1500	SOLUBLE	NO/YES/yes
F	-182	-164	INSOLUBLE	NO/NO/NA
G	2614	2850	slightly SOLUBLE	NO/YES/slightly

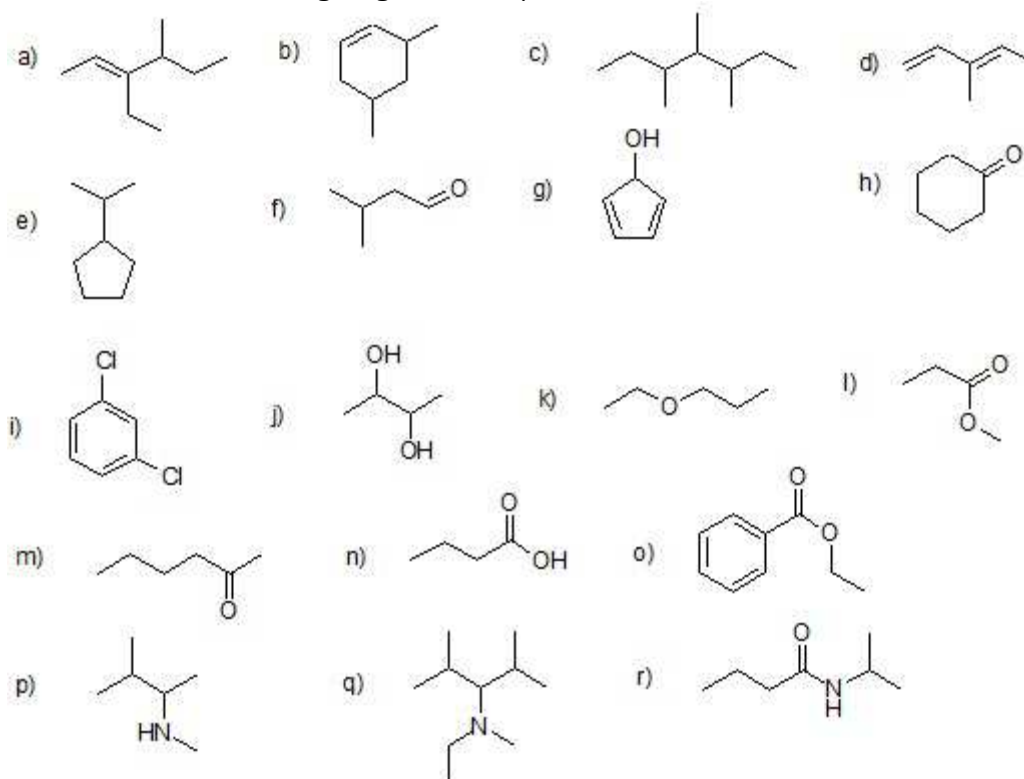
- a) Classify each substance as to the type of solid it represents (ie; molecular, metallic, ionic, network)
- b) six of the substances labeled "A" to "G" above are identified in random order below. Match the letter to the correct name and explain your reasoning.
calcium oxide, aluminum, methanol, sulphur, methane, potassium chloride

ORGANIC CHEMISTRY

Draw the structural formula for the following compounds:

- | | | |
|-------------------------------|------------------------------|-------------------|
| a) N,N-dimethylpentan-2-amine | b) 3-ethylcyclohexene | c) methylpropanal |
| d) 4-chloro-3-methylhex-1-yne | e) 2-ethoxypropane | f) propylbenzoate |
| g) N-ethylpropanamide | h) 2,3-difluorobutanoic acid | i) cyclobutanone |
| j) 2-methylhexan-3-ol | k) phenyl methanoate | l) hexa-2,4-diene |

9) Name the following organic compounds:



10. Complete the following chemical reactions by naming and drawing the molecular formula the organic product(s). Assume all required conditions are available for each reaction.

a) 3-methyl-1-butyne + 2Cl_2

c) 2-methylpentan-3-ol + KMnO_4

e) 2-methylbutanal + $[\text{O}]$

g) ethyl propanoate + H_2O

b) methane + excess O

d) methylpropene + HBr

f) pent-1-ene + H_2O

h) ethanoic acid + methanamine

11) Consider the following organic compounds:

propanone, propan-2-ol, 2-chloropropane, propanoic acid, propane

a) For each compound, identify the type of intermolecular forces acting between molecules

b) Rate the solubility of each compound in water as: insoluble, slightly soluble or very soluble

c) Arrange the compounds in order of increasing boiling point.